An Empirical Study on The Impact of Foreign Institutional Investments on Indian Stock Market

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1. Introduction

India was self-reliant country until 1990s. Economic progress and industrial development were a big challenge in 1990s. Being a developing economy, India was trying to attract foreign investors in to the country. Prior to 1991, foreign investment played a very limited role in the Indian economy. The twin deficit crisis (trade balance deficit and large fiscal deficit) in early 1980s led India to airlift the gold reserves to International Monetary Fund (IMF) as a collateral for international loan. The crisis further resulted in New Economic Policy (NEP) where LPG (Liberalisation, Privatisation, Globalisation) is one of the major initiations during tenure of then Prime Minister P.V. Narasimha Rao and then Finance Minister (former Prime Minister) Dr. Manmmohan Singh. Economic liberalisation successfully introduced in early 1990s as a part of NEP after two unsuccessful economic liberalisation in1966 and early 1980s (during the tenure of former Prime Minister late Mr. Rajiv Ghandhi). As an initiation of the economic reforms in 1991, the Government of India (GOI) changed its view towards foreign investment—both direct and portfolio as a progressive effort.

Liberalisation in economic policies allowed foreign capital to flow into Indian capital market with some restrictions. Foreign direct investments (FDI), foreign portfolio investments (FPIs) through foreign institutional investors (FIIs), American depository receipts (ADRs), Global depository receipts (GDRs), foreign venture capital investments (FVCIs), foreign private equities (PEs) were allowed to invest in Indian capital market. The foreign capital started to inflow in the form of Foreign Direct Investments (FDIs) and Foreign Institutional Investments (FIIs). Companies are allowed to raise capital from international market through their equity. The liberalization led Indian economy to integrate with other economies in the world and started to attract foreign capital since 1993. According to Foreign Portfolio survey (2016-17) conducted by Pwc (2017) says, 67% of FPI respondents preferred India as their destination among emerging economies.

The financial institution established outside India which proposes to make investment in Indian capital market is termed as FIIs. Being a developing economy, India started attracting foreign capital since their inception (September 14, 1992) and started investing in primary and secondary capital market instruments like debt, debentures, equities, warrants etc. Initially the FIIs were

regulated by RBI (Reserve Bank of India) under Foreign Exchange Management Act (FEMA), 1999 and then from 2003 it has been regulated by the Securities and Exchange Board of India (SEBI) under SEBI (FII) Regulations, 1995. Thereafter FIIs have started registering in SEBI and SEBI acts as a control body and monitors the investment made by FIIs through the portfolio investment route. Overseas hedge funds, insurance companies, pension funds, mutual funds etc., can become a FII by registering themselves in SEBI. Since from its introduction the GOI extended its support to FII flows into Indian economy. According to SEBI statistics, the number of FIIs registered is increased over the period from 18 (1992) to 9816 (2020). However, in 2014 FIIs are merged with other two existing class of investors viz., Sub Accounts (SAs) and Qualified Foreign Investors (QFIs) and termed as 'Foreign Portfolio Investors' (FPIs) and regulated under SEBI (Foreign Portfolio Investors) Regulations, 2014. FPI regime initiated from FII, since from June 1, 2014. Pursuant SEBI approved Designated Depository Participants (DDPs). The SEBI approved DDPs issue registration to FPIs on behalf of SEBI (SEBI, 2014). Further DDPs carry out other allied regulations to the FPIs which they need to follow in Indian market during their operation. Discussing about investment slab by FIIs, earlier, they were allowed to invest up to five percent of the issued and paid-up capital of the company, further it was increased to 24 percent to attract the foreign investments in Union budget 1997-98. At present, RBI has fixed the ceiling of 24 per cent can be raised up to sectoral cap/statutory ceiling, subject to the approval of the board and the general body of the company passing a special resolution to that effect. (For instance, HDFC Ltd.-74%, Infosys Technologies Ltd.-100%, Punjab Tractor Services Ltd.-60% etc.).

FIIs are in great need to emerging economies, to increase labour productivity as well as to increase foreign exchange reserve which helps to meet trade deficit of the nation (Rai & Bhanumurthy, 2004) and maintain the balance of payments. They serve as a catalyst for the growth of Indian economy. They generally help to achieve the liquidity in stock market and increase PE (Price-Earning) ratios (Dhingra et al., 2016), which also help to improve stock market functions. The strong economic fundamentals of the nation helped to gain the confidence of foreign investors and they made net positive investment since they were allowed to invest in the Indian market. According to the World Investment Report (2016) by UNCTAD, India continues to be top ten countries globally in terms of FDI inflows and fourth in Asia as developing economy (SEBI, 2017). Investors have been registered as FPIs in India from different parts of the world. USA (United States of America) (3302) has occupied a major portion of investment, followed by Luxembourg (1163), Canada (665), Mauritius (569), Singapore (457) and so on. In terms of Assets under custodian (AUC), again USA takes a major portion, followed by Mauritius, Singapore, Luxembourg, UK etc. This kind of huge

inflows and the integration of world markets influence on the movement of the Indian market as well as the exchange rate.

With the ongoing globalization the role of institutional investors in foreign capital flows has increased to a great extent. They are being regarded as kingpin of financial globalization. The developing countries like India generally have a chronic shortage of capital. The entry of FIIs is expected to bring that much needed capital. However, as most of purchases by FIIs are on secondary market, their direct contribution to investment may not be very significant. Yet, FIIs contribute indirectly in a number of ways towards increasing capital formation in the host country.

FIIs in general, play as a significant driving force for Indian capital market and financial stability of the nation. They invest in large volume for short-run. Their huge buy and sell impact on Stock market movement as well as economy of any emerging nation. The increase in FII flows caused for volatility in the economy. FPIs and FDIs became the key factors for the integration of Indian economy with world economy (Kumar & Devi, 2013) and stimulate the investors to invest in the market, which also helps in the establishment of long-run relationship with world markets. FIIs play a crucial role in Indian capital and derivatives market. They have increased their participation in the primary market and started investing in IPOs (Initial Public Offerings). Considering the importance of FII in an emerging economy like India, the present study aims to examine the impact of FII on Indian stock market.

A Stock market, equity market or securities market is an aggregation of buyer and seller of stocks or shares or securities which represent ownership claims on business. Stock market is one of the key factors of economic growth, where stock market influence economic activities by creating liquidity in the economy. The stock market values are determined the trading activities done by market participants like, investors, brokers, etc. Foreign investors are one among many players in the Indian stock market. These investors will affect by level of economic development of the host country. The favourable macro-economic fundamentals of India, tend the economy as an attractive destination for investment by foreigners across the globe. In connection with the desired objective, the study reviews past literature and identifies the gaps. The entire study presented in following different chapters.

1.1 Chapter Scheme

The present study intends to present contribution of FIIs to Indian stock market and analysis of impact of Foreign Institutional Investment on Indian stock market. The research outcome presented in the following chapters.

Chapter 1: Introduction: The chapter conceptualise foreign institutional investment (FII) in India, overview of FIIs, Indian stock market along with regulatory framework and recent developments in FII in India. Further, it includes the entire structure of the study.

Chapter 2: Review of Literature: The second chapter reviews relevant literature on FII in association with Indian Stock market and economy. The chapter further observes the methodology used, in addition, identifies the research gap in previous studies.

Chapter 3: Research Design: The chapter discusses the need and objectives of the study. The sources, period of data, variables, methodology used to analyse the data. The research techniques adopted are discussed.

Chapter 4: The Trend of Foreign Institutional Investors in Indian Economy: This chapter presents an analysis of trend of FIIs/FPIs which includes number of registered FIIs, investments in various segments, inflow-outflow status, the role of Participatory notes, investments from various countries with associated events in Indian economy.

Chapter 5: Structural Breaks in Indian Stock Market: The chapter intends to identify the structural breaks in the time-series under consideration. The characteristics of each structural breaks are presented in descriptive statistics and stationarity test.

Chapter 6: FIIs and Volatility in Indian Stock Market: This chapter discusses the contribution of FIIs to volatility in the Indian stock market under various structural breaks.

Chapter 7: FIIs and Liquidity in Indian Stock Market: This chapter discusses the contribution of FIIs to liquidity in the Indian stock market under various structural breaks.

Chapter 8: FIIs and Stock Market Integration: This chapter discusses the long and short-run dynamics, equilibrium process and casual effects employed between FIIs and Indian stock market.

Chapter 9: Findings and Conclusion: The chapter presents the research findings derived by researcher and concluding remarks along with limitations of the study.

2. Review of Literature

2.1 Literature Review on Trend and Pattern of FII in India

This section attempts to review past literature which speaks about trends of FII investments in India. There are few previous studies captured the trend and pattern of FIIs flow in India. The studies like Jeyanthi (2016), Kaur & Dhillon (2010), Kulshrestha (2014), Sarkar (2017), Sharma (2014), Singh (2009) etc. are identified the trend and pattern of FIIs in Indian economy and found increasing investments by FIIs flow into Indian economy. Their studies show the total investment has reached US$ 108 billion in FY2007-08 and Rs.93725 crores in FY2011-12 with 1765 FIIs registrations. The increasing trend provides an evidence for India has been always an attractive investment destination for foreign investors. However, the previous studies identified the negative investments by FIIs in FY1998-99, and FY2008-09 and downfall in FY2002-03 and FY2011-12. These results supported the volatile nature of foreign investments and further supported the fact that such investments are considered as hot investments which strongly influences the total inflows into the Indian economy and significantly contribution to the Indian stock market.

2.2 Literature Review on Market volatility and liquidity in India

The study further reviewed some important literature in connection with market volatility and liquidity with FII flows. The literature opines that (Guercio, 1995; Sharma, 2014) the FII/FPIs frequently change their portfolio which causes market volatility and result in high market liquidity. The BSE SENSEX liquidity, volatility and returns were highly influence by FII flows in Indian Stock market (Chittedi, 2008; Behera, 2012; Rastogi & Husain, 2015), which further increases the volatility in Indian stock market. However, some studies (Chordia et al., 2001; Prasanna & Bansal, 2014) proved that the trading activities by FIIs contribute negative information on market liquidity and granger causes market volatility, which further results in excess of volatility and lower the liquidity. As a market liquidity measures, the past literature considered market capitalisation, trade volume, value traded (Chordia et al., 2001; Porter, 2003; Prasanna & Bansal, 2014; Bhattacherjee, Morphet, Gutiérrez Bayo, Nam, & Pardo, 2017) and variance of market returns as volatility indicators. They have been covered BSE and SENSEX values as market proxy in their study.

2.3 Literature Review on Cointegration, Long and Short-run dynamics between FIIs and Stock market: Error Correction Mechanism

The literature related to integration of FII with Indian stock market has been reviewed. The study conducted by Eniekezimene (2012), Omoruyi & Osariemen, (2015) found long and short-run association between market capitalisation and FII flow in Nigerian economy. The significant ECM

factor indicates the foreign portfolio investment influence stock market performance in Nigeria in the short-run. This is a clear indication that foreign portfolio investment has a significant impact on stock market performance in Nigeria. Aduda, Masila, & Onsongo (2012) and Makoni & Marozva (2018) examined the determinants of Stock Market development in Nairobi Stock Exchange and Mauritius. They found that there is no significant relationship between stock market development and foreign portfolio investment. Some studies identified the long and short-run association between macro-economic indicators and FII flows in India (Dua & Garg, 2013; Kaur & Dhillon, 2010). However, very few studies captured the long and short-run relationship with equilibrium correction on Indian context (Bhasin & Khandelwal, 2014; Rajani & Mallikarjunappa, 2019).

2.4 Data and Methodological observation in Prior Studies

Review of past studies clears that majority of the studies have used secondary data to estimate the relationship between FII flows and stock market of the country. Some literature used macro-economic data to identify the factors determining FIIs in Indian economy. The trend analysis has captured by simple observation of FII flows in India and presented in pie charts, graphs and in tabular method (Chakrabarti, 2001; Saravanakrishnan V, 2012; Sharma, 2014). The authentic web sources like SEBI, NSDL, RBI, NSE, NASDAQ etc. has been used as data source for analysis in the previous studies. Monthly and daily observations from said sources on variables are used to capture the relationship. As macro-economic variables the previous studies largely used real exchange rate (US$INR), IIP, WPI, foreign reserves, inflation rate from both host and home country. As stock market indicators like returns and risk from both host and home countries, ex-ante risk, share holding pattern of the companies, market liquidity, market capitalisation, trading cost, turnover, stock market activities both in host and home country, PE Ratio, EPS, market size, labour cost, productivity, liberalised trade, political status are used as determining factors of FII flows in India (Rai & Bhanumurthy, 2004; Kaur & Dhillon, 2010; Bhasin & Khandelwal, 2014; Mohanasundaram, et al., 2015; Dhingra, et al., 2016). Overall, the sample period has observed up to 2016 in the previous studies. Depending on availability of sample many studies used time-series analysis to draw empirical results. In general, the time-series data has been tested for its properties under ADF (Augmented Dickey Fuller) and PP (Philip Perron) test for unit root, descriptive statistics. The correlation analysis has been carried out to estimate the correlation of FIIs with macro-economic and stock market. The OLS estimation is used under multivariate regression analysis. The VAR and Granger causal effect tests re used to check the cause and effect by past values of dependent and independent variable on present values of dependent variable in short-run. The VECM model is used to capture the long-run cointegration between variables in the regression

model. The ARDL approach rarely used to capture long and short-run association with equilibrium process between the variables in the past study.

2.4 Research Gap

It has been found that many of Indian studies have given attention to FDI and its impact on Indian economy (e.g., Aggarwal & Solomon, 2017; Chahat, 2015; Kumar & Devi, 2013; N.Prabaharan, 2018; Sinha & Rani, 2016; Sultana & Pardhasaradhi, 2012), due to the importance of FDI on development of Indian economy and nature of investment compared with FII. Nevertheless, there are studies on FIIs and its impact on Indian economy as stated above. Likewise, there is availability of literature on FIIs impact on Indian stock market. Majority of the studies has been found that causal relationship between FIIs and market returns predominantly. The other indicators of market like volatility, liquidity indicators are rarely tested in connection with FIIs flows. There are studies captured the cointegration relationship between FIIs and market and economic indicators. However, very few studies captured long and short-run relationship with equilibrium process between FIIs and market indicators. Another major observation from previous literature is usage of data for the analysis. Majority of the studies used monthly data to capture the FII impact on market or economic indicators. Further, the data has been used without considering the breaks in the series. Which further captures different magnitude of the coefficients in different time period. Speaking about the trend and pattern of FIIs in India, the previous literature has been covered up to FY2011-12 and the associated socio-economic or political events national as well as international has missed out factors in the previous literature. Present study makes an attempt to bridge these identified gaps.

3. Research Design

3.1 Need of The Study

India is an emerging economy which started attracting foreign investors since 1992. The increasing importance of foreign capital by Indian companies and sound macro-economic fundamentals of the nation keep attracting foreign funds in both direct and indirect way. Foreign Portfolio investors are one of the key makers of Indian stock market. Their ‘push’ and ‘pull’ strategy creates fluctuation in the stock market, which further affects the economy of the nation. In addition, FIIs respond to the news (asymmetric information) across the globe where the retrospective effect can be observed in equity markets of economies especially in emerging markets (EMs). This uncertainty in the stock market and thereby to the economy by FIIs attracted researchers, academicians, financial advisors,

economists to analyse the effect empirically in respective area of research. The present study made an attempt to add literature to existing knowledge of area by empirically testing the contribution of FPI on Indian stock market by considering the effect on market volatility, liquidity. The study further captures the equilibrium process associated between FPIs and Indian stock market in the long-run. The study tries to provide an inclusive report on trend and pattern of FPI flows in India economy.

3.2 Objectives of the Study

Based on the literature and identified gap with dearth of Indian studies in the area of FPI in connection with Indian stock market, the present study formulates certain objectives to meet the research gap empirically. The objectives of the study as follows;

1. To study the trend and pattern of FIIs in Indian economy.
2. To empirically examine the FIIs contribution on India Stock market indicators like volatility and liquidity of Indian stock market in different time periods.
3. To empirically study the long and dynamic (short-run) relationship between FII flows and market indicators.
4. To empirically analyse the equilibrium process between FII and India market indicators.
5. To analyse the casual relationship between FII and Indian stock market indicators.

3.4 Research Methodology

The present research is carried exclusively on secondary data. The study is based on the need, objectives and scope. It is decided to analyse empirically the impact and relationship between FPIs and Indian stock market. Extending, it finds the relationship and causal effect between FPI flows, Indian Stock Market and US Exchange Rate. Considering the objectives of the study the data has been selected from authentic sources like Reserve Bank of India (RBI), National Stock Exchange of India Limited (NSE), National Securities Depository Ltd. (NSDL) and Securities and Exchange Board of India (SEBI). The research contemplates the data of NSE, FPI flows and US$INR Exchange rate. The NSE and S&P (Standard & Poor) CNX Nifty is one of the most reliable Indian Stock Market and securities index which reflects present condition of Indian Stock Market. The study used CNX Nifty closing values (returns), market capitalisation, trade volume and turnover from NSE and FPI flows like gross purchases, sales and exchange rate as variables to estimate models in order to establish the said relationship. The study considered yearly data from FY1992-93 to FY2020-21 and daily data from FY1999-2000 to FY2018-19 and for market liquidity indicators from FY2003-04 to FY2018-19.

3.5 Research Techniques

The study used daily observations for 20 long years from both NSE and FPI flows. The nation and the world economies are exposed various socio-economic, political, events or crisis in past 20 years. Therefore, the present study identifies the structural breaks in the time-series under consideration. To identify the structural breaks in Indian market the study used Bai-Perron test (for unknow breaks) and Chow-test (for known breaks) and found four breakpoints which further identifies five structural breaks in the series. Based on the structural breaks the series is divided into five groups and analysed separately.

1. Bai-Perron Test → $y_t = x_t'\beta + z_t{}'\delta_j + u_t$
2. Chow Breakpoint Test → $y_t = \alpha + \beta x_{1t} + \gamma x_{2t} + \varepsilon$

Further, the descriptive statistics have been drawn for each structure (breakpoints) period to understand the characteristics of the time-series used for analysis. The correlation analysis has been tested between variables to establish correlation relationship between FPI flows and indicators from Indian stock market. Further, under time-series analysis it is necessary to test the time-series for stationarity or unit root. The employed time-series are tested under Augmented Dickey Fuller (ADF) and Philip-Perron (PP) test for stationarity.

1. ADF test → $\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t$, where coefficient $\delta = 0$ and $\sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} = 1$ status indicates the presence of unit root
2. PP test→ $Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \varepsilon_t$, where null hypothesis as $\delta = 1$

3.5.1 Volatility estimation

Further, the study estimated volatility in CNX Nifty returns under GARCH(1,1) model. The model augmented with FPI flows and exchange rate as exogeneous variable in the model to analyse the impact of FPI and exchange rate on CNX volatility. It helps to analyse the impact of FPIs and exchange rate on Indian market volatility. The GARCH model is the combination of two equations, i.e., mean (ARCH) equation and variance (GARCH) equation. The ARCH term of the model indicates the impact of recent information on Indian market volatility and GARCH term indicates the impact of previous volatility on current volatility of CNX Nifty. The estimated model under the section is as follows;

1. AR Model → $y_t = \mu + \phi y_{t-1} + u_t$
2. ARMA Model → $y_t = \alpha + u_t + \sum_{i=1}^{p} y_{t-1} + \sum_{i=1}^{q} \theta_i u_{t-i}$
3. Variance equation → $\sigma_t^2 = \omega + \alpha u_{t-1}^2 + \beta \sigma_{t-1}^2$

4. GARCH(1,1)→ $\sigma_t^2 = \omega + \alpha u_{t-1}^2 + \beta\sigma_{t-1}^2 + \varphi Z$,
   assumed: $\omega > 0, \alpha \geq 0, \beta \geq 0, \varphi \geq 0$
5. GARCH(1,1) model of the study →
   $\sigma_t^2 = \omega + \alpha u_{t-1}^2 + \beta\sigma_{t-1}^2 + \varphi_1 fpigp + \varphi_2 fpigs + \varphi_3 exr$, where
   σ_t^2→ Conditional variance → GARCH term
   u_{t-1}^2→ Conditional mean → ARCH term

The study estimates volatility for various structural groups (regime or phases) under consideration.

3.5.2 ARDL Approach

To estimate the impact of FPI on Indian stock market the study used Autoregressive Distributed Lag Model (ARDL). The model employees the series under different order of integration i.e., at level [I(0)] or at first difference [I(1)]. The model considers lagged values of dependent and independent variables along with current value of independent variable. The model includes sufficient number of lags to estimate from general to specific modelling framework (Shrestha & Bhatta, 2018). The ARDL model denoted with the notation *ARDL (p, q_1, ...q_k)* order, where *p* is the lag of dependent variable, q_1 is the number of lags of the first independent variable and q_k is the lag numbers of *k* th variable of explanatory. The ARDL specification can be formed by combining equation (1) and (2), and presents as follows;

1. Distributed Lag model → $y_t = \alpha + \sum_{i=0}^{p} \beta_i x_{t,t-i} + u_t$
2. Autoregressive model→ $y_t = \alpha + \beta x_t + \gamma y_{t-1} + u_t$
3. ARDL Model →

$$y_t = \alpha + \sum_{i=1}^{p} \gamma_i y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} x_{j,t-i}{}' \beta_j + \epsilon_t$$

The lag length determined through simple model selection procedure. The study considers the lowest AIC value to measure the lag length criteria for each set of models under consideration. The study period divided as suggested by Bai-Perron test and modelled under different group with ARDL specification. The model of the study is as follows;

1. Market Capitalisation as a dependent variable

$$mc_t = \alpha + \sum_{i=1}^{p} \gamma_i mc_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} fpi_{j,t-i}{}' \beta_j + \epsilon_t$$

2. Trade volume as a dependent variable

$$tv_t = \alpha + \sum_{i=1}^{p} \gamma_i tv_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} fpi_{j,t-i}{}'\beta_j + \epsilon_t$$

3. Turnover as a dependent variable

$$to_t = \alpha + \sum_{i=1}^{p} \gamma_i to_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} fpi_{j,t-i}{}'\beta_j + \epsilon_t$$

3.5.3 Cointegration Long-run Approach and disequilibrium correction

The cointegration relationship explains the long-run relationship between explanatory and dependent variable. As a pre-requisite the variables must be integrated at same level to estimate cointegration relationship under traditional method of Johansen's cointegration test. However, the ARDL approach counters the requirement of same level of order of integration and allows different level of integrated variables to test the cointegration association between employed variables in the model. The model further helps to know the correction of disequilibrium occurred in the previous period. It gives the speed of disequilibrium correction and reaches the equilibrium point. The ARDL-equilibrium process presented below;

$$\Delta y_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta x_{j,t-i}{}' \beta_{j,i}{}^* - \hat{\phi} EC_{t-1} + \epsilon_t$$

Where, EC_{t-1} represents the lagged values of error correction term, $-\hat{\phi}$ represents the speed of error correction mechanism. Theoretically, the model associated with null hypothesis as there is no long-run association between explanatory and dependent variable, $H_0: \hat{\phi} = 0, and\ H_0 = \gamma_i^* + \beta_{j,i}^* = 0$, $H_1: \hat{\phi} \neq 0, and\ H_1 = \gamma_i^* + \beta_{j,i}^* \neq 0$.

The model of the study is as follows;

$$\Delta mc_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta mc_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta fpi_{j,t-i}{}' \beta_{j,i}{}^* - \hat{\phi} EC_{t-1} + \epsilon_t$$

$$\Delta tv_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta tv_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta fpi_{j,t-i}{}' \beta_{j,i}{}^* - \hat{\phi} EC_{t-1} + \epsilon_t$$

$$\Delta to_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta to_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta fpi_{j,t-i}{}' \beta_{j,i}{}^* - \hat{\phi} EC_{t-1} + \epsilon_t$$

3.5.4 ARDL-Bounds Test – Long and Short-run Dynamics

Further, the ARDL model can be transformed into dynamic specifications where, it can produce dynamic relationship between the variables under consideration. Using equilibrium process Pesaran, Shin and Smith (2001) produced Bounds test to describe the long-run or level relationship between dependent and independent variables. The Bounds test procedure is presented as follows;

$$\Delta y_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta y_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta x_{j,t-i}' \beta_{j,i}{}^* - \rho y_{t-1} - \alpha - \sum_{j=1}^{k} x_{t-1}' \delta_j + \epsilon_t$$

$\rho = 0 \rightarrow$ Long-run coefficients of dependent variable

$\delta_1 = \delta_2 = \cdots \delta_k = 0 \rightarrow$ Long-run coefficients of explanatory variable

$\gamma_i{}^*$ and $\beta_{j,i}{}^* \rightarrow$ Short-run relationship

$$\Delta mc_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta mc_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta fpi_{j,t-i}' \beta_{j,i}{}^* - \rho mc_{t-1} - \alpha - \sum_{j=1}^{k} fpi_{t-1}' \delta_j + \epsilon_t$$

$$\Delta tv_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta tv_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta fpi_{j,t-i}' \beta_{j,i}{}^* - \rho to_{t-1} - \alpha - \sum_{j=1}^{k} fpi_{t-1}' \delta_j + \epsilon_t$$

$$\Delta to_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta to_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{q_{j-1}} \Delta fpi_{j,t-i}' \beta_{j,i}{}^* - \rho to_{t-1} - \alpha - \sum_{j=1}^{k} fpi_{t-1}' \delta_j + \epsilon_t$$

3.5.5 The Causal effect Test – Granger Causality test

The learning of cause-and-effect relationship in financial or economic time-series is important task to study the causal effect between two or more financial or economic series. Predominantly, the Granger causality test has been used to establish cause-and-effect relationship between economic variables. The test consists of system equations

$$Y_t = \sum_{i=1}^{n} \alpha_i X_{t-i} + \sum_{j=1}^{n} \beta_j Y_{t-j} + u_{1t}$$

$$X_t = \sum_{i=1}^{n} \lambda_i X_{t-i} + \sum_{j=1}^{n} \delta_j Y_{t-j} + u_{2t}$$

with four relationships. (*i*) unidirectional causality running from X to Y (X→Y) is indicates if the estimated coefficients of lagged 'X' are statistically different from zero ($\sum \alpha_i \neq 0$) and the coefficients of 'Y' is not statistically different from zero ($\sum \delta_j = 0$). (ii) The same unidirectional causal relationship run from 'Y' to 'X' (Y→X) if the lagged coefficients of 'Y' are not statistically different from zero ($\sum \alpha_i = 0$) and the coefficients of 'X' is significantly different from zero ($\sum \delta_j \neq 0$). The third relationship is (iii) feedback relationship or bilateral causal relationship where

the coefficients of both variables in system equations are statistically different from zero ($\sum \alpha_i \neq 0$ and $\sum \delta_j \neq 0$). The fourth relationship is (iv) the independent variables. The obtained coefficients are not statistically significant from zero ($\sum \alpha_i = 0$ and$\sum \delta_j = 0$) (Gujarati, 2003, p.697). The cause-and-effect relationship has been estimated among market indicators like returns, closing values of CNX Nifty, market capitalisation, trade volume and turnover against FPI flows and exchange rate.

Wald Test

The coefficients are collectively tested under Wald test to examine the collective contribution of an explanatory variable into dependent variable in the model. The test also been considered as hypothesis testing. The hypothesis of wald test is

Ho: FPI coefficients are collectively equals to zero

H1: FPI coefficients are collectively different from zero

Model specification under Ramsey RESET

To identify the model specification, the study used Ramsey RESET test which helps to identify the non-linear combination of explanatory and dependent variable in the model. The significant power of fitted value (fitted^2, fitted^3 etc.,) tells that the model is having misspecification and it follows non-linear function. The insignificant power says the model is specified correctly and follows linear combination. The test is validated under the value of *F*-statistics. The significant *F*-statistics suggests the presence of misspecification in the model. The misspecification generally causes biased estimation from the model.

Model stability test — CUSUM (Cumulative Sum) of recursive residuals

The model stability was tested by using CUSUM (Cumulative Sum) stability test proposed by Brown, Durbin and Evans, 1975. The test uses recursive residuals from the estimation and graphical in nature. The null hypothesis of the test is 'stable parameters of the model'. The CUSUM statistics always expected to be zero (Brooks, 2008, pp.187) and plotted under ±2 standard error bands around the zero or with five percent critical lines. Any statistic crosses the bands is considered as instable parameters. The stable parameters of the model provide evidence for stability of the model under consideration.

Model Assumptions

The autocorrelation or serial correlation on obtained model residuals are tested by using Breusch-Godfrey (1978) LM test. To test the normality, the descriptive statistics like skewness, kurtosis, JB Statistics and corresponding *p*-value are considered in the study. The heteroscedastic nature of the model has been tested under GARCH and Breusch Pagan LM test.

4. The Trend of Foreign Institutional Investors in Indian Economy

The present study observed FPI investments right from their inception in the year FY1992-93 to FY2020-21. It has been found that India remained as an attractive destination among emerging economies by FPIs. The positive upward trend has been observed year-on-year by these FPIs in Indian economy. The guidelines and ceiling on FIIs investment amended timely by RBI and SEBI. Since 1992 the FPIs/FIIs are exposed to various global, host and home country events and affects. The timely amended statutory rules, economic vulnerability across the world, socio-political changes were affected to FPI flows into India in long 28 years.

The study observed the number of registered FIIs from FY1992-93 to FY2019-20. In the first year FY1992-93 the 18 institutions were registered as FIIs in India, which further reached to 158 FIIs in the next year. The increased FIIs registration indicates that the foreign investors have found potentiality in Indian market in the second year of their inception in Indian capital market. In other words, the market gained the confidence of foreign investors as soon as it is opened for global investment. The number of registrations by FIIs are found increasing and slight down in FY1998-99. The year was exposed to 'Asian Financial Crisis' which was found unfavourable international economy and FIIs are withdrew their registration from Indian market. However, the registration found addition in the next year. The situation was similar in other indices too (SEBI, 2002). The bearish movement further caused by 9/11 terrorist attack (2001), and massive outflow of FIIs in the month of September, 2001 (SEBI, 2002). The Sensex was dropped to 2600 points at the end of the month. It took almost three months to recover. The major stock exchanges like New York Stock Exchange (NASDAQ), London stock exchange and other stock exchanges around the world were closed and evacuated and took month to recover. This terrorist attack produced adverse effect on the economy (Muneeswaran & Babu, 2017). There was a high correlation between Dow Jones and BSE Sensex in September, 2001. Except in the month of September, the FII inflows were positive in all the months of FY2000-01. Thereafter the number of registrations were found upward until FY2011-12 and started down trending since FY2012-13 to FY2014-15. However, these years are

exposed to Global Financial crisis (FY2007-08). The registration slowly started increasing in numbers from FY2015-16 till date.

Trend of FII/FPIs in Various Segments of Indian Capital Market

As foreign investors allowed to invest in Indian capital market as FIIs in the year 1992, they were allowed to invest in securities or equities, bonds as debt instruments of Indian Stock market. They started investing in equities from FY1992-93 massively, and initiated investment in debt securities from FY1996-97. In recent past, SEBI introduced Hybrid securities in FY2017-18 and Debt-VRR (Voluntary Retention Route) in FY2019-20. The FIIs are introduced with equity investment in FY1992-93 with Rs.13 crore and it reached to Rs.61150 crores, in between there was positive and negative fluctuations. The upward trend has observed in FPI investments in 28 years except few years which exposed to socio-economic vulnerable across the globe. The first negative investment has observed in FY1998-99 as the year was experienced for Asian financial crisis. The second negative investment observed in FY2008-09 as the year exposed to Global Financial Crisis (GFC) and curb on Participatory Note (P-Note). Since FY1999-00 the net investment was found positive till FY2007-08 though the year was termed for GFC. During the period the investment through P-note was active. The increasing demand for P-Notes creates liquidity in Indian market which further results in market volatility. Special Investigation Team (SIT) investigated that P-Notes act as a major channel for the process of round tripping of black money of India with international tax havens. Yet another fear of government is that P-Notes are being used for money laundering and terror financing. The rising demand for PNs made registered FIIs re-route their investments. In FY2007-08 almost 44% of FIIs investment has made through P-Notes. Lahiri Committee Report (Ministry of Finance, 2004), in consultation with RBI and SEBI, uplifted the RBI suggestion that the P-Notes will not be issued to an unregulated or unregistered FIIs and principle of KYC (Know-Your-Clients) strictly adhered to the investors. SEBI further suggested that non-eligible unregulated P-Notes can expire, or can be wound-down by maturity or within a time period of five years, whichever is earlier. Along with, regular reporting requirement has been imposed on all FIIs. This curb resulted in negative investment in FY2008-09. The next negative flow was observed in FY2015-16 and FY2018-19 and FY2019-20. In FY2015-16 domestic market impacted by global financial turbulence. The global spill overs and vulnerability rendered sporadic volatility in global financial instruments and portfolio flows across the globe. The FY2018-19 was beginning with combination of global spill overs, raised volatility in crude oil process, geopolitical and trade pressures and Brexit triggered capital flows out of emerging economies. The year marked as unanticipated swings which resulted in weakening the macroeconomic performance during

FY2018-19. The FY2019-20 the economic meltdown across the globe and in India and Covid-19 affected FPI flows into India. The USA, followed by Mauritius, Luxemburg, UK, Norway, Canada, Ireland, Netherlands and Japan are the top ten countries to invest in India.

Figure 1: Trends in FPIs flow

Figure 2: Assets Under Custody

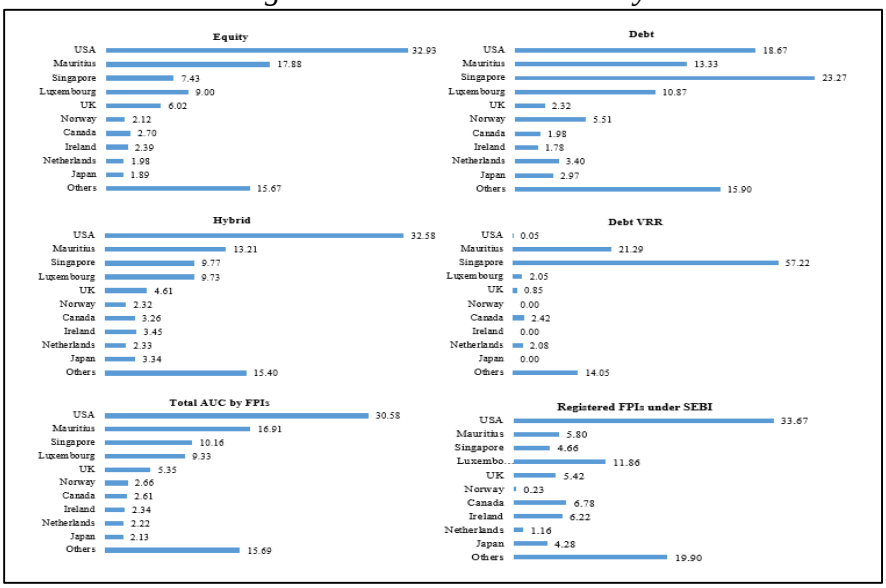
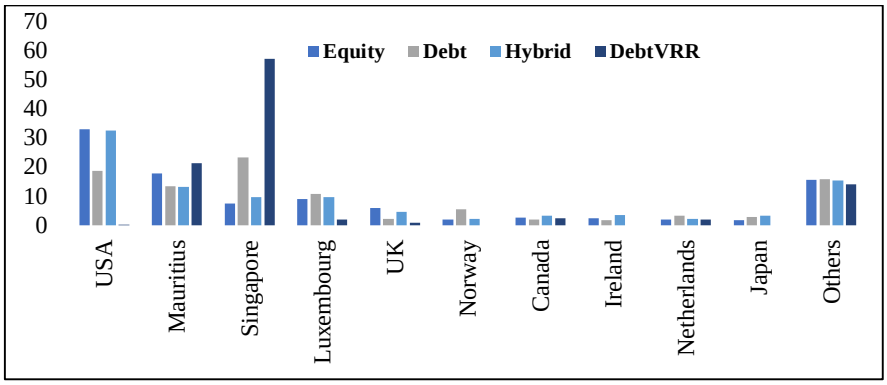


Figure 3: Assets Under Custody



5. Result and Discussion

5.1 Structural Breaks in Indian Stock Market

Based on the literature and requirement the study applied break least square regression on CNX Nifty closing values and found multiple break points under Bai-Perron's break point test using Global Information Criterion (GIC). The null hypothesis of the test is 'no structural breaks against alternative' in the series. The obtained break points are retested under Chow's break point test to check the existence of breaks in the given points. The result of these multiple structural breaks are summarised in Table 5.1, Figure 5.1.

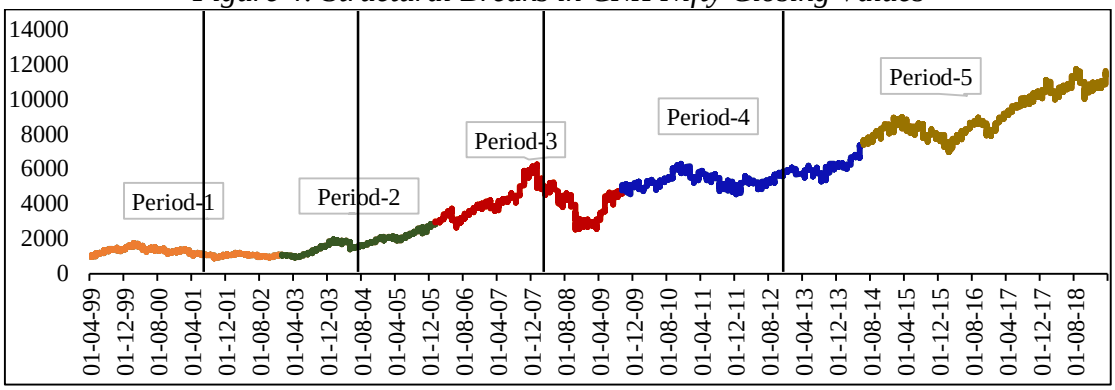
Table 1: Regime wise Sub-groups of Data

The table presents Regime wise Sub-groups of data for period of FY1999-2000 to FY2018-19**.**

Break Dates	Sample Period	From	To	Observations
-	1	01-04-1999	10-01-2003	942
13-01-2003	2	13-01-2003	24-01-2006	762
25-01-2006	3	25-01-2006	04-09-2009	885
07-09-2009	4	07-09-2009	30-05-2014	1114
02-06-2014	5	02-06-2014	29-03-2019	1164
		Total Observations		4867

Source: Authors' computation

Figure 4: Structural Breaks in CNX Nifty Closing Values



Source: NSE

The Table 1 presents the sub-groups of the study data. Each sub-group termed as regimes or different phases of Indian stock market during the study period. The characteristics of each sample period has been drawn with the help of descriptive statistics like mean, median, mode, standard deviation, normality etc. Further, each set of time-series tested for stationarity under ADF and PP test. The stationarity result shows the market indicators CNX Nifty closing, market capitalisation, trade volume and turnover are becoming stationary or free from unit root at their first difference, i.e., I(1) order. Along with exchange rate also follows I(1) to become stationary in its nature. However, CNX Nifty return and exchange return follows stationary at their level i.e., I(0) order. The independent variable FPI flows like gross purchases, sales and net investments will follow stationarity at I(0) and I(1) order based on different sample period or size of the study. Since the series are integrated at different order using ARDL approach an appropriate method to estimate developed objectives. Further, each sub-group are tested against FPIs flow under volatility (GARCH), liquidity (ARDL approach), equilibrium, long and short-run dynamics and causal effect (Granger causality) to obtain developed objectives of the study.

5.2 FIIs and Volatility Indian Stock Market

The prices or market returns are subjected to swing according to the portfolio flows (Rastogi & Husain, 2015). FIIs are speculators by nature and unpredictable (Gupta, 2011). They invest in stocks for short-term gains. After attaining the short-term gain they move to other securities in the market (Sehgal & Tripathi, 2009). Their behaviour liquefies the stocks and might result in volatility in the stock price fluctuation and market as well. The short-run expectations by FPIs affects the market sentiments which leads high mobility in their investments and increases the stock market volatility in the developing markets. The increasing volatility may tend to delay in investments to avoid the uncertainty. Since FPIs' trading happens to be on continuous basis, the impact on host country stock market remains lasting. Their participation triggers the upward market movement

and increases the liquidity and volatility (Upadhyay, 2006; Chittedi, 2008) in the market. In this respect the present study analysed the impact of FPIs on Indian stock market and drew following result.

To estimate volatility in Indian stock market the study used GARCH(1,1) model and FPI flows (purchases and sales) and exchange rate are considered as exogeneous regressors in the model and each time period analysed separately. The study found that the mean return and previous value of Indian stock market significantly contributing information on current volatility of Indian stock market. Along with the market reacts to the recent information (ARCH) and own previous volatility (GARCH) are more significant and contributing more than 80% of the information on current volatility in the market. However, the FPI values and exchange rates also contributes positive as well as negative information on CNX volatility based on each time period. The exchange rate remained insignificant in the last regime as the period more volatile and down falling due to global economic meltdown and Covid-19 pandemic. It has been observed that the coefficient values or the level of information is different in each time period which proves the presence of structural breaks in the series. Further, it has been observed that the correlation between FPI flows and CNX Nifty is positive. The correlation is negative between FPI flows with exchange rate and CNX Nifty with exchange rate. Continuing, the currency depreciates against raise in CNX Nifty and FPIs buy when currency appreciates in Indian market.

5.3 FIIs and Liquidity Indian Stock Market

The present study estimated the impact of FPI flows on Indian market volatility considering the liquidity measures like market capitalisation, trade volume and turnover from NSE. The result shows previous values of FPIs are significant to explain market capitalisation for all the regimes except last regime. The coefficients collectively remained significant except last regime under wald test. Further, the FPIs are remained significant for all the sample period except first sample period. Collectively, FPIs are significant to explain trade volume except first sample period. The coefficients of FPIs on turnover plays significant for all regime except first regime and collectively, it stays significant except first regime.

5.4 Cointegration and Long-run Associations — Equilibrium Process

The present section of the study examines the cointegration relationship between FPI net flow and market indicators like market capitalisation, trade volume and turnover. To identify the cointegration relationship between variables under consideration the ARDL Bounds *F*-test has been

applied based on formulated ARDL models of the study. The results of ARDL Bounds *F*-test produced in following table.

Table2: ARDL Bounds *F*-Test Cointegration —Market Indicators with FII

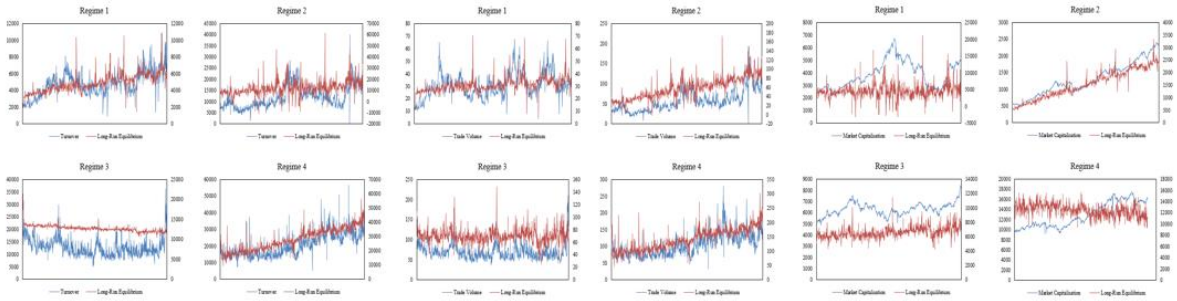
This table presents the Result of ARDL Bounds *F*-test Cointegration of Market Capitalisation, Trade Volume and Turnover with FPINI under different regimes from March 2003 to March 2019 (FY2003-04 to FY2018-19).

Dependent variable	**Regime 1**		**Regime 2**		**Regime 3**		**Regime 4**	
	***F*-stat**	**K**	***F*-stat**	**K**	***F*-stat**	**K**	***F*-stat**	**K**
Market Cap	292.8371	1	310.8627	1	641.8124	1	348.7604	1
Trade volume	149.3914	1	150.2006	1	269.7429	1	239.8851	1
Turnover	140.1228	1	158.5485	1	213.9988	1	257.2714	1
Significance level								
	10%		**5%**		**2.50%**		**1%**	
Lower Bound	5.59		6.56		7.46		8.74	
Upper Bound	6.26		7.3		8.27		9.63	

Source: Author's Computation

The Table 2 presents Wald *F*-statistics values with corresponding cointegration level (K). The obtained *F*-statistics are compared with Pesaran et. al. (2001) critical value in various significance level with bound limits. The result further discloses one (K=1) significant cointegration relationship between market capitalisation, trade volume and turnover with FPINI. The values of *F*-statistics (Wald test) are greater than the upper bound I (1) critical value for all four regimes of the study period. The result reveals the existence of long-term cointegration between market-cap, trade volume and turnover with FPINI in all the regime which leads to reject null hypothesis of 'no long-run cointegration relationship of market-cap, Trade Volume and Turnover with FPINI. Indeed, the graphical representation clarifies the long-run equilibrium relationship of dependent variables namely, Market Cap, Trade Volume and Turnover with independent variable FPINI. The graphs for different regimes are presented below;

Figure 5: Convergence of Long-run Equilibrium—ARDL Specification



The Bounds test for cointegration which expresses the long-run cointegration and equilibrium relationship between FPI flows and market indicators. The result reveals that obtained *F*-statistics (Wald test) for all the regime and for all the variables is greater than one per cent Pesaran critical

value, which leads to the refusal of null hypotheses of 'no cointegration relationship between FPIs and market indicators. The rejection of null hypothesis tends to anticipate the presence of a steady long-run cointegration and equilibrium association between FPI flows and market indicators. In other words, the result evidently proves that there is a long-run association between Indian market and FPI flows.

5.5 Disequilibrium Correction

The test result of ARDL Bounds *F*-test for cointegration further leads to assess the correction of disequilibrium occurs in the previous period. The result of error correction mechanism (ECM) for four regimes with three market variables against FPI is presented below;

Table 3: Equilibrium Result —ARDL Approach

This table presents the Result of ECT Equilibrium Result of Cointegration of Market Capitalisation, Trade Volume and Turnover with FPINI under different regimes from March 2003 to March 2019 (FY2003-04 to FY2018-19).

Regime	Variable	Coefficient	Std. Error	t-Statistic	P-value
Regime 1	Market Cap	-0.9655	0.0537	-17.9824	0.0000
	Trade Volume	-1.9308	0.1425	-13.5500	0.0000
	Turnover	-2.5565	0.1419	-18.0165	0.0000
Regime 2	Market Cap	-0.9018	0.0468	-19.2797	0.0000
	Trade Volume	-2.0312	0.1881	-10.7981	0.0000
	Turnover	-2.4303	0.1657	-14.6693	0.0000
Regime 3	Market Cap	-1.1233	0.1284	-8.7489	0.0000
	Trade Volume	-2.1442	0.0978	-21.9140	0.0000
	Turnover	-2.4883	0.1165	-21.3608	0.0000
Regime 4	Market Cap	-1.6558	0.3350	-4.9431	0.0000
	Trade Volume	-2.3966	0.1049	-22.8579	0.0000
	Turnover	-2.7615	0.1013	-27.2477	0.0000

Note: Coefficient = $-\hat{\phi}EC_{t-1}$
Source: Author's Computation

The table (ECT table) presents the result of error correction mechanism, which expresses the speed of adjustment to the equilibrium in the long-run. The coefficient values $(-\hat{\phi}EC_{t-1})$ for all the dependent variables across the regime is negative in value and significant at 99 per cent confidence level as desired. The negative with significant coefficient of previous error term describes the speed of adjustment towards long-run equilibrium. The coefficient values are different for each regime, which indicates the density of the data in each regime is different with structural changes. It also indicates that the variables change their nature in every regime and displaying different behaviour throughout the study period. The coefficient of market capitalisation is -0.9655, -0.9018, -1.1233 and -1.6558 for regime one, two, three and four respectively. It can imply that the speed of adjustment towards long-run equilibrium is approximately 97 per cent, 90 per cent, 100 per cent and 165 per cent of any disequilibrium occurred in the previous period between FPI and market-

cap would be corrected in every next period. On an average, the speed of correction is 100 per cent (average of four coefficients for four regime) for entire data set. As market-cap act as an investor opinion indicator the disequilibrium is relatively corrected by FPIs 100 per cent on an average and equilibrated in the long-run. The observation from the result is the speed of error correction is relatively high (90-96 per cent) in first two regimes and it is trying to overshoot the economic equilibrium in the next two regimes, where the regimes are witnessed for major global and domestic events like GFC (2008-09), general election (2014), demonetisation (2016), US election (2016) GST (2017), general election (2019) etc. Further, the Table shows the coefficient value for trade volume is -1.9308, -2.0312, -2.1442 and -2.3966 for regime one, two, three and four respectively. It indicates the speed of correction of previous divergence occurs between trade volume and FPI is 193 per cent, 203 per cent, 214 per cent and 240 per cent approximately is corrected in every next period for regime one to four. Approximately, the correction remains 200 per cent (average of four regimes). It indicates the divergence rises in the previous period will meet equilibrium in the next period. Continuing, the coefficient values of previous error term of dependent variable turnover shows -2.5565, -2.4303, -2.4883 and -2.7615 for regime one, two, three and four respectively. It indicates the speed of error correction is around 255.65 per cent, 243.03 per cent, 248.83 per cent and 276.15 per cent of any disequilibrium arises in previous day between FPI and turnover would be corrected in every next day. On an average, the speed is 260 per cent approximately every day. The speed is remained approximately 240 to 270 range. The results indicate that the divergence is too high and they converge in a very high speed.

5.5 Long and Short-run Dynamics

In the short-run, the FPI values are significant to explain market liquidity indicators like market capitalisation, trade volume and turnover. In other words, FPIs are contributing significant information on market liquidity indicators in the short-run. In the first and last regime FPIs are contributing negative information on market capitalisation. FPIs are contributing negative information on trade volume for all the regimes in the short-run. Turnover as a dependent variable, FPIs are contributing significant negative information for all the regimes in the short-run. Hence, the inference is, the FPIs are contributing negative information in order to explain the market capitalisation, trade volume and turnover in the short-run.

In the long-run the FPIs are significant to explain market capitalisation in first three regimes with positive contribution of information. In case of trade volume and turnover only in second regime FPIs are contributing positive significant information in order to explain the variables. In the last regime FPIs are remained insignificant to explain market liquidity indicators as the economy was

under meltdown situation and other macro-economic variables also influenced on Indian stock market indicators.

5.6 Causal relationship

Further, the study concentrates on the causal relationship between FPI flows and market series. As discussed in the research methodology section, analysing the causal effect between foreign flows and market variables are important to know the causal relationship between financial time-series. The study considers the market capitalisation, trade volume, and turnover of NSE and closing price and returns of CNX Nifty as market variables. The FPI flows like FPI net investments, gross purchases and sales are considered as foreign flow variables to examine the causal relationship between the FPI flows and Indian market. Along with FPI flows and market series the study further used Exchange rate (ER) and its return to find out the causality of exchange rate with FPI flows and Indian stock market. The Granger causality test has been used to estimate the said causal relationship. The lowest AIC (Akaike information criterion) value has suggested fifth lag of the variables for the study. The result of causal relationship is as follows;

FPI Net flow	←	CNX Nifty closing	Unidirectional
FPI Net flow	⇆	Market capitalisation	Bidirectional
FPI Net flow	⇆	Trade volume	Bidirectional
FPI Net flow	⇆	Turnover	Bidirectional
FPI Gross Purchases	←	CNX Nifty closing	Bidirectional
FPI Gross Purchases	⇆	Market capitalisation	Bidirectional
FPI Gross Purchases	⇆	Trade volume	Bidirectional
FPI Gross Purchases	⇆	Turnover	Bidirectional
FPI Gross Sales	←	CNX Nifty closing	Unidirectional
FPI Gross Sales	⇆	Market capitalisation	Bidirectional
FPI Gross Sales	⇆	Trade volume	Bidirectional
FPI Gross Sales	⇆	Turnover	Bidirectional
Exchange Rate	⇆	FPI Net flow	Bidirectional
Exchange Rate	⇆	FPI Gross Purchases	Bidirectional
Exchange Rate	⇆	FPI Gross Sales	Bidirectional
Exchange Rate	⇆	CNX Nifty closing	Bidirectional
Exchange Rate	→	Market capitalisation	Unidirectional
Exchange Rate	⇆	Trade volume	Bidirectional
Exchange Rate	⇆	Turnover	Bidirectional
FPI Net flow	⇆	FPI Gross Purchases	Bidirectional
FPI Net flow	⇆	FPI Gross Sales	Bidirectional
FPI Gross Purchases	⇆	FPI Gross Sales	Bidirectional
CNX Nifty Returns	⇆	Exchange Rate Returns	Bidirectional

It is clear that the CNX closing values and exchange rates are causing FPI flows or FPI flows keenly observe and follow CNX Nifty movements exchange rate for their short-term investment in Indian stock market. It indicates that FPIs are feedback traders in Indian stock market. The study reveals bi-directional causal effect relationship running between FPI flows and market liquidity indicators. The CNX Nifty returns and return on exchange rate follows bidirectional causal relationship.

6. Findings

Trend and Pattern of FIIs in India

The present study captured the trend and pattern of FPIs in India from FY1992-93 to FY2020-21, almost for a successful period of 28 years from the introduction of FIIs in Indian economy. It was found that the India is an attractive destination for foreign investments. It was found overall the increasing trend in FPI flows. In the long tenure of 28 years of FPIs, it was found that equity segment is more fluctuate than debt segment. FIIs started to invest in debt segment from the FY1996-97 and after 21 years (FY2017-18) in hybrid segment and in FY2019-20 in Debt-VRR segment. The overall investment found upward trend in FPI flows. The Russian default (August, 1998), GFC (2007-08), P-Notes crisis in October, 2007, Global vulnerability in FY2015-16, economic meltdown and weakened macro-economic fundamentals made FPIs to remain negative investors in Indian market for said period. It was found USA holds top position in AUC followed by Mauritius, Singapore and Luxembourg. The country Netherland and Japan hold lowest position in top ten countries. The USA, European, Asian and African countries are the major investors in India. It is observed that developed economies generally invest in emerging economies where they expect higher returns (Leeds & Sunderland, 2003). Further, bilateral trade and comprehensive agreements with mentioned countries help in avoiding double taxation (Dua & Garg, 2013). It indicates the trade agreement between two countries help to attract foreign investments from developed economies.

Structural Breaks in Indian Stock Market

The study has considered a period of 20 long financial years (FY1999-2000 to FY2018-19) of daily data from stock market and FPI investments. The 20 long years are witnessed for many significant structural changes in the financial market which intertwined with Indian economy. According to previous literature these structural changes bring ‘regime shift’ (A. Sarkar, 2012) and need to be studied separately. The present study also considered CNX Nifty closing values to identify the structural breaks under Bai-Perron Structural breakpoint test and Chow test from FY1999-2000 to FY2018-19 and found four significant breaks as 13-01-2003, 25-01-2006, 07-09-2009 and 02-06-

2014. Further, these breaks may not be the exact dates of any major events in the economy, however they are the representatives of the corresponding periods and regime shift in CNX Nifty series.

Impact of FII on Stock Market Volatility

The correlation analysis between FPI flows and CNX Nifty shows positive for all sample period except fifth (last) sample period, where the sample period expressed high fluctuation in nature. Overall, there is a positive association between CNX Nifty and FPI flows. However, the CNX Nifty and exchange rates are negatively correlated and indicates inverse relationship between these two. It indicates when CNX Nifty takes upward trend the exchange rate takes opposite direction and vice versa. Likewise, the correlation between FPI and exchange rate also presents negative relationship in all the sample periods. This indicates, the depreciation in INR against US$, FPIs reduce their investment and they make their investment when currency appreciates as it represents the human tendency. The positive correlation between CNX Nifty and FPI and inverse relationship between CNX Nifty, FPI with exchange rate clearly indicates FPIs are purchasing when currency appreciates and their purchase positively affect to the movement of CNX Nifty. Further, the volatility estimation under GARCH (1,1) approach, considering FPI Flows (FPIGP and FPIGS) and exchange rate returns (US$INR) as variance regressors for each sample period. The study reveals that the presence of volatility clustering in CNX Nifty returns in each sample period. It shows, the small volatility follows small volatility and the large volatility follows large volatility. It proves, the current return of CNX Nifty is correlated positively with its previous period return or volatility and it is evidenced from mean equation of GARCH (1,1) estimation, where previous period returns are significant in estimating present values of CNX Nifty (overall sample) in the long-run. Further, the mean equation indicates the average returns of CNX Nifty 'μ' is significant for second, third, fifth and whole sample period to explain volatility in CNX Nifty. However, it shows declining in average returns sample by sample in the study period. It shows that, as density in investment increases in the series the average return reduces. The study found from mean equation the average return as well as the previous return values are significant in explaining the current volatility of CNX Nifty. In addition, the study revealed that Indian stock market are more reacting to their own previous volatility and next to the recent information in the market. The other variables contribute less information. The study further proves that the FPIs are in race of making profit and come out in a shorter period which causes volatility in Indian stock market. Their short-run volatile behaviour may have effect on Domestic Institutional and Retail Investors which may end as a looser in the market. Therefore, it is essential to observe the FPIs behaviour in the market before making any investment. The investor who seeks short-position in market can observe the daily activities of FPIs

and monthly observation for long position. However, it is up to the investor to meet the speed of the FPIs in the market. As economy is concern, the volatility created by FPIs affect the stock market and thereby influence the host economy.

Impact of FII on Stock Market Liquidity Indicators

The present study estimated the impact of FPI flows on Indian market volatility considering the liquidity measures like market capitalisation, trade volume and turnover from NSE. The result shows previous values of FPIs are significant to explain market capitalisation for all the regimes except last regime. The coefficients collectively remained significant except last regime under wald test. Further, the FPIs are remained significant for all the sample period except first sample period. Collectively, FPIs are significant to explain trade volume except first sample period. The coefficients of FPIs on turnover plays significant for all regime except first regime and collectively, it stays significant except first regime.

It is found that the series are almost constant till FY2005-06, and thereafter found fluctuating (FY2006-07 to FY2013-14). Then FY2015-16 to FY2020-21 found upward trend with a significant swing. The correlation analysis between FPI Net flows (FPINI) and market liquidity indicators shows positive correlation in all sample period of the study. It reflects the FPIs are positively contributing information on market liquidity indicators, which further provides an evidence for FPIs are creating liquidity in the market. Collectively, FPIs are significantly contributing information to explain market liquidity indicators. Overall, FPIs are remained liable to explain market liquidity in the entire study period however, they change their magnitude of influence from time to time by responding to socio-economic and political events as well as macro-economic fundamentals of the host country.

Integration and Equilibrium between FII Flows and Indian Stock Market

The study revealed that the FPI flows and Indian stock market cointegrated in the long-run and the disequilibrium occurred in the previous period will be recovered in the next period with over speed and system reaches the equilibrium status in the long-run. The overshooting disequilibrium indicates the speed of error correction mechanism lies between FPI flows and Indian stock market. It indicates that the volume of money FPIs invest turns the market into busy market. The speed of market recovery improves the market and helps domestic investors to follow foreign investors, provided with domestic or retail investors are matching with the speed of FPIs invest in the Indian market. Further, the study reveals that FPIs contribute majorly a negative information in the short-run and positive information in the long-run. The causal effect result shows feedback relationship

between FPIs and market liquidity indicators and unidirectional relationship running from daily values of Indian stock market to FPI flows.

7. Conclusion

The present study provides an analysis of impact of FIIs on Indian Stock Market. The trend of FIIs have been studied in detail. The study further estimated the structural breaks in Indian stock market and estimated the influence of FIIs on volatility, liquidity of the stock market. In addition, the study analysed the correction of disequilibrium and long and short-run dynamics between stock market and FII flows along with causal effect. The study revealed that, the significant trend in FIIs flow which responded to international and national macro-economic fundamentals. It was found that, significant structural breaks in Indian stock market and the FIIs are liable to explain the volatility and liquidity in the Indian market. The study discloses that, the presence of long-run cointegration relationship between FIIs flow and stock market and the emerged disequilibrium in the previous period has been corrected in the long-run. It was observed that, significant long and short-run dynamics between FIIs flow and Indian market. Further, the study identifies that FIIs behave as feedback trader in Indian market. The study suggests that the domestic or retail investors can follow FIIs to make their investment in Indian market to take long or short position in Indian market. Collectively, FIIs are major contributor to the Indian stock market as well as economy. However, the study is not free from certain limitations. The data of the study has been collected from RBI, SEBI, NSDL and NSE. The rationality of the result is based on the nature of the database. To assess the impact of FII on Indian market volatility, liquidity and long and short-run dynamics the study used daily observation of market closing values, returns, market capitalisation, trade volume and turnover covered financial years from 1999-2000 to 2018-19 from index NSE and daily FPIs activities from NSDL. The study could extend to assess individual company performance in respect to FPIs investment. In terms of methodology the asymmetric information effect could be assessed.

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